AMENDMENT TO THE CLAIMS

Claims 1-22 (Cancelled).

23 (New). A plane hairspring for a regulating device of a timepiece movement and having a plurality of turns including an outer turn, the plane hairspring including along the outer turn a stiffened portion arranged to cause deformations of the turns of the hairspring to be substantially concentric when the hairspring is in operation in the timepiece movement, wherein said stiffened portion is a portion of strip of thickness in the plane of the hairspring greater than a thickness of a remainder of the strip forming the hairspring, and the extra thickness is defined by the stiffened portion relative to the remainder of the strip situated exclusively along on an outer side of the outer turn.

24 (New). The plane hairspring according to claim 23, wherein the thickness in the plane of the hairspring of the stiffened portion varies over the entire length of the stiffened portion as a convex and continuous function and presents a minimum substantially equal to the thickness of the remainder of the strip at the two ends of the stiffened portion and a maximum that is greater than the thickness of the remainder of the strip between said two ends.

25 (New). The plane hairspring according to claim 23, wherein the thickness in the plane of the hairspring of the stiffened portion is substantially constant over the entire length of said stiffened portion.

26 (New). The plane hairspring according to claim 23, wherein the thickness in the plane of the hairspring of the stiffened portion is substantially constant over the entire length of said stiffened portion except in terminal portions where, respectively, the thickness decreases continuously towards the ends of said stiffened portion.

27 (New). The plane hairspring according to claim 1, wherein the height of the hairspring is substantially constant over the entire length of said hairspring.

28 (New). A plane hairspring for a regulating device of a timepiece movement and having a plurality of turns including an outer turn, the plane hairspring including along the outer turn a stiffened portion arranged to cause deformations of the turns of the hairspring to be substantially concentric when the hairspring is in operation in the timepiece movement, wherein said stiffened portion is a portion of strip of thickness in the plane of the hairspring greater than a thickness of a remainder of the strip forming the hairspring, and the thickness of the stiffened portion in the plane of the hairspring varies over the entire length of the stiffened portion as a convex and continuous function and presents a minimum substantially equal to the thickness of the remainder of the strip at two ends of the stiffened portion and a

maximum that is greater than the thickness of the remainder of the strip between said two ends.

29 (New). A timepiece movement including a regulating device including a balance and the plane hairspring according to claim 23.

30 (New). The timepiece movement according to claim 29, wherein the spacing between a terminal portion of the outer turn and the last-but-one turn of the hairspring is large enough for said last-but-one turn to remain free radially during expansions of the hairspring up to amplitudes corresponding substantially to the maximum angle of rotation of the balance in said movement.

31 (New). The timepiece movement according to claim 30, wherein a maximum angle of rotation of the balance in said movement is equal to 330°.

32 (New). The timepiece movement according to claim 30, wherein the spacing between the terminal portion of the outer turn and the last-but-one turn of the hairspring is large enough for said last-but-one turn to remain free radially during expansions of the hairspring up to amplitudes corresponding substantially to the knocking angle of the balance in said movement.

33 (New). A method of designing a plane hairspring for a regulating device of a timepiece movement including:

defining a plane hairspring of constant strip thickness;

calculating the unbalance of said plane hairspring;

calculating a portion of the outer turn of said plane hairspring having the same unbalance as the plane hairspring; and

stiffening said outer turn portion.

34 (New). The method according to claim 33, wherein said stiffening step includes stiffening said outer turn portion sufficiently so that said outer turn portion substantially does not deform during operation of the hairspring.

35 (New). The method according to claim 33, wherein said stiffening step includes increasing the thickness of said outer turn portion in the plane of the hairspring.

36 (New). A method of designing a plane hairspring for a regulating device of a timepiece movement including:

defining a plane hairspring of constant strip section;

calculating the unbalance of said plane hairspring;

calculating a portion of the outer turn of said plane hairspring having the same unbalance as the plane hairspring; and

varying the thickness, in the plane of the hairspring, of the strip forming the hairspring between an angle δ_1 and an angle δ_2 such that $\delta_1 < \beta_1$ and $\delta_2 > \beta_2$, where $\beta_2 - \beta_1$ is the angular extent of said portion of the outer turn, the thickness being caused to vary in accordance with a predetermined function $\underline{f}$ presenting a minimum substantially equal to the thickness of the remainder of the strip at the angles δ_1 and δ_2, the function $\underline{f}$ and the angles δ_1 and δ_2 being selected so that the deformation of the turn portion delimited by the angles δ_1 and δ_2 is substantially the same as the deformation which would occur if the thickness of the strip between the angles δ_1 and β_1 and between the angles β_2 and δ_2 were the same as that of the remainder of the hairspring and if, between the angles β_1 and β_2, the stiffness of the outer turn were equal to a predetermined value, greater than that of the remainder of the strip.

37 (New). The method according to claim 36, wherein said predetermined value is infinite.

38 (New). The method according to claim 36, wherein the predetermined function $\underline{f}$ is convex and continuous.

39 (New). The method according to claim 33, further including providing a spacing between a terminal portion of the outer turn and the last-but-one turn of the hairspring, said spacing being large enough for said last-but-one turn to remain free radially during expansions of the hairspring up to amplitudes corresponding substantially to the maximum angle of rotation of a balance in said movement.

40 (New). The method according to claim 39, wherein said step of providing a spacing includes:

defining a first point on the radial axis passing through the outer end of said hairspring having said stiffened portion, the first point being situated beyond the last-but-one turn of said hairspring when said last-but-one turn is expanded by an amplitude corresponding to the maximum angle of rotation of the balance;

defining a second point on the outer turn;

interconnecting the first and second points by a circular arc that is tangential to the outer turn at the second point;

defining a third point on the circular arc between the first and second points, the third point being such that the length of the segment of the circular arc delimited by the second and third points is equal to the length of the initial turn segment delimited by the second point and the initial outer end of the hairspring; and

giving a thickness in the plane of the hairspring to the circular arc between the second and third points that is identical to the thickness of the initial turn segment, the

resulting turn segment between the second and third points constituting a corrected terminal portion of the outer turn.

41 (New). The method according to claim 40, wherein the second point is situated at the end of the stiffened portion that is further from the outer end of the hairspring.

42 (New). The method according to claim 39, wherein said step of providing a spacing includes:

defining a point on the outer turn in the stiffened portion;

offsetting the terminal portion of the hairspring extending from said point radially outwards by giving the inner side of said terminal portion a circularly-arcuate shape the center of which is the geometrical center of the hairspring and the outer side of said terminal portion a shape that gives said terminal portion a thickness in the plane of the hairspring that is identical to the thickness of the corresponding initial terminal portion of the outer turn; and

connecting the terminal portion with the remainder of the stiffened portion by a connection portion that forms a double bend.

43 (New). A method of making a plane hairspring for a regulating device of a timepiece movement, including designing the hairspring according to the method as defined in claim 33 and then fabricating said hairspring.

44 (New). A method of making a plane hairspring for a regulating device of a timepiece movement, including designing the hairspring according to the method as defined in claim 36 and then fabricating said hairspring.